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Results: All patients demonstrated on-treatment reduction in MRI-defined GTV (Figure 1). Average reduction in tumor size from treatment initiation to completion of therapy was 51.0% (median 52.1%) and ranged from 30.5-70.8%. At a time point of fraction six, average reduction in GTV size was 38.2% (median 34.8%). Linear correlation across median values at each time point suggested a consistent decline over time of approximately 4% per day, with the most pronounced changes occurring between the 5th and 6th fractions.

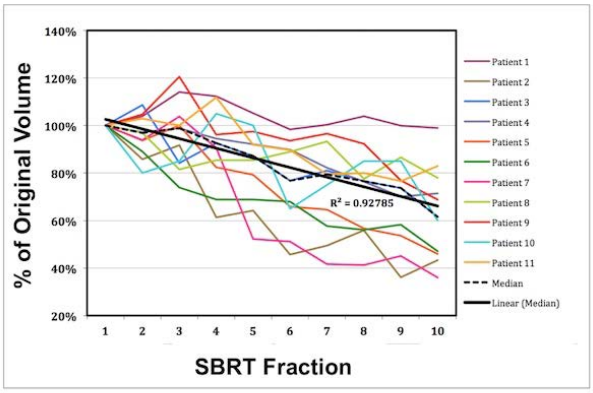

Figure 1. On-treatment change in gross tumor volume (GTV) as defined on daily magnetic resonance (MR) set up imaging at each of 10 fractions for patients treated with SBRT to the central thorax.

Conclusion: Tumor volume decreased considerably during treatment for most patients undergoing lung SBRT. The dosimetric impact of this degree of MRI-defined tumor volume change during the course of therapy has yet to be assessed. However, adaptive planning during the course of SBRT may be dosimetrically advantageous for sparing of surrounding critical structures, particularly for disease involving the central thorax.

EP-1226

Quality of life in locally-advanced non-small cell lung cancer patients: a systematic review

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Purpose or Objective: Non-small cell lung cancer has a substantial impact on health-related quality of life (HRQoL) of affected patients. Measuring HRQoL in lung cancer patients is an important approach to forecast and assess the relative risks and benefits of a treatment as experienced by patients. A systematic literature review was performed to provide an overview of prospective studies measuring HRQoL in patients with locally-advanced non-small lung cancer (LA-NSCLC) receiving treatment with curative intent, published over the last 10 years.

Material and Methods: The literature search was performed in four electronic databases: PubMed, ScienceDirect, MEDLINE and Embase. The inclusion criteria for the studies were: English language, clinical trial, study population with LA-NSCLC, treatment with curative intent, HRQoL assessment, full text availability and published over the last 10 years.

Results: Only 5 studies out of the 225 potentially eligible studies matched our inclusion criteria. Four of these were randomized controlled trials; one was a prospective cohort study. All studies included radiotherapy at least in one of the evaluated treatment arms. Details of the studies and the analyzed parameters are shown in the table. HRQoL was a secondary endpoint in four studies and a co-primary endpoint in one. No significant treatment-related improvement or deterioration in HRQoL has been reported in the included studies. Variability has been observed in terms of use of HRQoL instruments and statistical analysis.

Conclusion: Evaluation of HRQoL in patients with LA-NSCLC receiving curative intent treatment remains scarce. Reporting and statistical analysis of HRQoL data lacks standardization. More research is needed to address these issues in both clinical trials and daily care of patients receiving radiotherapy as part of their primary treatment for LA-NSCLC. Based on these considerations, a prospective cohort study has been launched in our institute, which aims to evaluate HRQoL, treatment-induced toxicity and neurocognitive functioning in patients with unresectable LA-NSCLC receiving radiotherapy, all or not in combination with concurrent or sequential chemotherapy.

EP-1227

Salvage radiotherapy for regional lymph node recurrence after surgery of non-small cell lung cancer

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Purpose or Objective: To evaluate clinical outcomes of salvage radiotherapy for regional lymph node (LN) recurrence developing after radical surgery of non-small cell lung cancer (NSCLC).

Material and Methods: Between 2008 and 2013, out of patients with NSCLC who achieved complete response (CR) after definitive treatment (surgery with or without chemotherapy), 31 patients developed regional LN (mediastinum, hilum, and supraclavicular area) recurrence (median age, 66 years; stage Ⅰ, n = 17; stage Ⅱ, n = 7; stage ⅢA, n = 7). The median time from definitive surgery to recurrence was 12 months (range, 3-80). Fifteen patients (48.4%) had single LN recurrence and others had multiple LN recurrence. All patients were irradiated to the recurred LN area with daily fractions of 2.0 Gy (n = 27), 2.5 Gy (n = 2), or 3.0 Gy (n = 2) by 3D-conformal radiotherapy. The median total dose for recurred LN was 66 Gy (BED 79.2 Gy10; range, 65.1-79.2 Gy10). Sixteen patients received chemotherapy either.

Results: The median follow-up was 14 months (range, 3-76). After salvage radiotherapy, 16 patients (51.6%) achieved CR, 9 patients (29.0%) partial response, and 6 patients (19.4%) stable disease. After salvage radiotherapy, one- and two-year in-field local control rate was 88.4% and 75.8%, respectively. Only two patients experienced an out-of-field mediastinal recurrence. One- and two-year progression-free survival rate from initial salvage radiotherapy was 73.1% and 50.9%, respectively. Progression site was predominantly distant. Overall, ten of 31 patients (32.3%) were successfully salvaged as CR state. Recurred LN size (<3 vs. ≥3 cm) was a significant prognostic factor for progression-free survival (p = 0.03). Pneumonitis requiring conservative treatment (grade 2 or more) occurred in 5 patients (16.1%). There was no radiation-related mortality.

Conclusion: Salvage radiotherapy for regional LN recurrence after radical surgery was suggested to be an effective treatment option with an acceptable level of toxicity. The recurred node size (3 cm cutoff value) was a strong predictor of progression-free survival. Aggressive salvage radiotherapy should be considered as a front-line treatment in regional LN recurrence of NSCLC.

EP-1228

Pulmonary toxicity after 3D-CRT or VMAT-based stereotactic radiotherapy for early stage lung cancer

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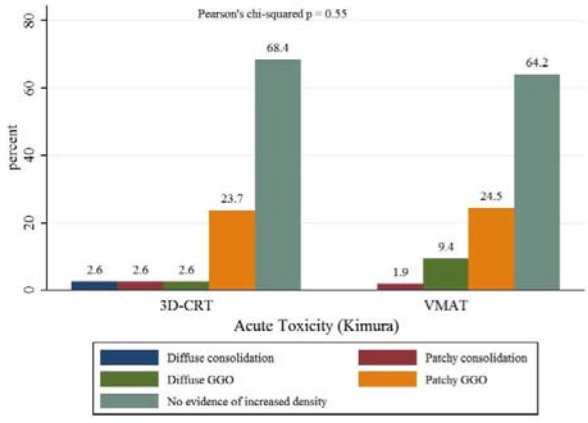
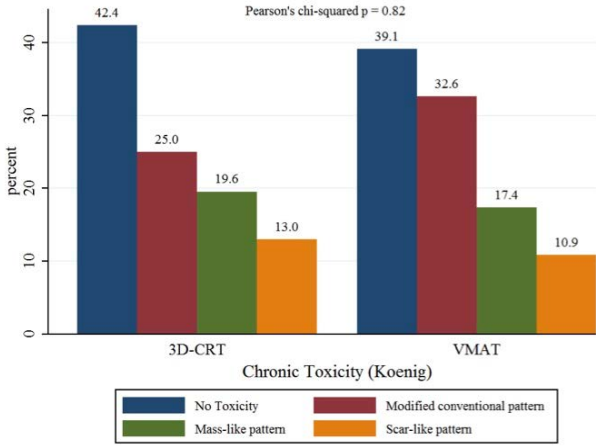
Purpose or Objective: To compare patterns of acute and late clinical/radiological lung toxicity following either 3D or image-guided VMAT stereotactic radiotherapy for stage I non-small cell lung cancer (NSCLC).

Material and Methods: In this observational study, we included 148 patients from a prospective mono-institutional SBRT series (time interval 2004-2014). All subjects had peripheral tumors and a prescription BED10Gy (at 80%) in the range 100-120 Gy. The first 95 patients (2004-2010) were planned with 3D-CRT, using multiple non-coplanar fields; a stereotactic body frame was used with CTV-PTV margins of 5 mm (antero-posterior and latero-lateral) and 10 mm (cranio-caudal). The second cohort (2010-2014) included 53 patients, planned with volumetric IMRT, using a single/multi arcs VMAT technique, on a PTV generated with 3 mm margins from a patient's specific ITV (obtained from 4D-CT), with a frameless approach through cone-beam CT guidance. Clinical acute and late toxicities were scored according to RTOG scales; radiological acute (<6 months from SBRT) and late (>6 months post SBRT) toxicity on the basis of modified Kimura and Koenig's classifications, respectively. Student's T test was used to compare clinical characteristics, and Pearson's chi square test to compare the incidence of any grade lung toxicity.

Results: Patients and tumors' characteristics were similar and well matched between the groups. PTV volumes were also comparable (35.1 cc for 3D-CRT vs. 40.3 cc for VMAT,, p=0.16). Moreover, no significant difference was detected in Mean Lung Dose, converted in 2 Gy equivalent (11.7 vs. 10.4 Gy for 3D-CRT and VMAT, respectively, p=0.13). Frequencies of acute and late clinical toxicity (all grades) were superimposable between 3D-CRT and VMAT (acute: 10.5% vs. 22.6%, p=0.28; late: 4.2% vs. 13%, p=0.09, respectively). The crude rate of RTOG acute grade 3 radiation pneumon itis was 2.1% after 3D-CRT and 3.8% after VMAT. Acute and late radiological toxicity patterns were also similar between the two cohorts. Figures 1 and 2 depict the incidence and grade of both, according to different treatments. As expected, late radiological toxicity occurred in approximately 60% of patients, with modified conventional (25% after 3D-CRT vs. 32.6% after VMAT) and mass-like (19.6% after 3D-CRT vs. 17.4% after VMAT) patterns as the most commonly observed findings.





Conclusion: Results of the present study indicate that the pattern of clinical and radiological toxicities following SBRT in peripheral early stage NSCLC treated with comparable BED10Gy is not influenced by the different techniques used for planning and delivery.

EP-1229

Non-small cell lung cancer: marked difference in first failure site depending on histology

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Purpose or Objective: Inoperable non-small cell lung cancer (NSCLC) comprises several histological subtypes, with squamous cell carcinoma (SCC) and adenocarcinoma (AC) being most frequent. The prognosis is poor with current chemo-radiation strategies and treatment intensification is limited by patient tolerance. It is therefore relevant to target experimental therapeutic approaches to a patient's risk of local versus distant failure. The purpose of the current study was to compare the pattern of first relapse after chemo-radiation for locally advanced pulmonary SCC and AC.

Material and Methods: We retrospectively included 193 patients with locally advanced NSCLC treated with chemo-radiotherapy from 2009 to 2012. Patients with initial stage IV (n=17) disease and/or patients with histology other than AC or SCC (n=22) were excluded leaving 155 patient for the analysis. Patients were identified and grouped according to first event as either: loco-regional (LR) failure; intra-cranial distant metastases (ICDM), extra-cranial distant metastases (ECDM); dead without evidence of disease (Dead, NED), with the remaining patients being Alive, NED at latest follow-up in August 2015. The cumulative incidence of events was compared across the histology subtypes, using the competing risk method of Fine and Gray.